AMENDMENTS TO THE CLAIMS

1. (Amended) In an information transmission system comprising a plurality of elements for generating, transporting, and receiving information, wherein some elements are defective and impose impairments on the information passing therethrough, a method for correcting said impairments, comprising~~ the steps of~~:

a) identifying defective elements and characterizing the defect of each, including performing a frequency analysis of each element;

b) determining a correction characteristic corresponding to each defective element, and creating a frequency characteristic complementary to said frequency analysis, such that the combination of said analysis and said complementary characteristic along with the correction characteristic ~~which~~, when applied to information passing through said element, corrects the impairment imposed by said element;

c) ~~formulating each correction characteristic as~~ creating a composite, two channel I and Q finite impulse response filter, having I-I and Q-Q direct components and I-Q and Q-I cross components, by combining said correction characteristics, and performing an inverse discrete Fourier transform of said complementary characteristic;

~~d) combining said correction characteristics of said defective elements into a single correction characteristic comprising two direct and two cross components;~~

~~e) identifying each of the four components of the combined correction characteristics with corresponding direct and cross impulse responses of a generalized two-channel filter;~~

~~f) creating such a filter in accordance with said components of step (e);~~ and

g) positioning said filter in said information transmission system for correcting said impairments imposed on the information by said defective elements.

2. (Original) An information transmission system, as in Claim 1, wherein said system is limited to a data receiver whose elements include an IF filter, a two-channel down-converter, and I and Q data processing channels.

3. (Original) An information transmission system, as in Claim 1, wherein said system is limited to a data generator whose elements include I and Q data channels, a two-channel up-converting modulator, and an IF filter.

4. (Canceled)

5. (Original) An information transmission system, as in Claim 1, wherein:

i. step (c) further includes arranging said direct and said cross components as terms of a set of 2x2 matrices; and

ii. step (d) further includes arranging said single correction characteristic as terms of a set of 2x2 matrices.

6. (Original) A generalized digital filter for filtering two-component signal information, comprising:

a) a dual input port, having an I input for a signal x_I and a Q input for a signal x_Q, wherein x_I and x_Q are components of a two-component input signal x;

b) a dual output port, having an I output for a signal y_I and a Q output for a signal y_Q, wherein y_I and y_Q are components of a two-component output signal y;

c) a first signal path, characterized by a first impulse response, having an input coupled to the I input port and a first output;

d) a second signal path, characterized by a second impulse response, having an input coupled to the Q input port and a second output;

e) a third signal path, characterized by a third impulse response, having an input coupled to the I input port and a third output;

f) a fourth signal path, characterized by a fourth impulse response, having an input coupled to the Q input port and a fourth output;

g) summing means for adding said first and second outputs and for coupling the sum thereof to said I output;

h) summing means for adding said third and fourth outputs and for coupling the sum thereof to said Q output.

7. (Original) A generalized digital filter, as in Claim 6, wherein said first, second, third, and fourth impulse responses are independent of one another.

8. (Original) A generalized digital filter, as in Claim 7, wherein said first, second, third, and fourth impulse responses are further constrained to have finite lengths.

9. (Original) A generalized digital filter, as in Claim 8, wherein said first, second, third, and fourth impulse responses are further constrained to have equal lengths.

10. (Original) A generalized digital filter, as in Claim 6, wherein said first, second, third, and fourth signal paths are realized by finite impulse-response filters.

11. (Original) A generalized digital filter, as in Claim 10, wherein each of said finite impulse-response filters is independently characterized.

12. (Amended) In applying a generalized two-channel digital filter to process an input data stream x and to produce an output data stream y, wherein both x and y are two-component signals x_I, x_Q, y_I and y_Q which are processed in blocks of $N/2$ data values long, N being a power of 2, and wherein the filter is characterized by four independent impulse response vectors h_{11}, h_{12}, h_{21} and h_{22} each vector of length $N/2$, a method for efficiently computing said output data stream y, comprising the preliminary steps of:

a) forming the vectors

$$a = \frac{(h_{11} + h_{22}) + j(h_{21} - h_{12})}{2} \; and \; b = \frac{(h_{11} - h_{22}) + j(h_{21} + h_{12})}{2}$$

b) appending $N/2$ zeros to each vector and performing an FFT on each vector to produce A_k and B_k, respectively,

and, for each block of $N/2$ data values in said input data stream x, additionally comprising the iterative steps of:

c) moving the previous block of input data values to ~~the~~ a first half of an input vector x_N of length N and loading the current block of input data values into ~~the~~ a second half of said input vector x_N;

d) treating x_N as a vector of complex numbers of the form $x_1 + jx_Q$, and performing ~~a~~ an N-point FFT to produce X_k;

e) computing ~~the~~ a complex vector $Y_k = A_k X_k + B_k X_{N-k}$, $0 \le k < N/2$, and performing an inverse FFT on the result to produce ~~the~~ a complex vector y_n;

f) designating ~~the~~ a second half of y_n as the $N/2$ output samples of the current iteration, according to $y_{In} = Real(y_n), y_{Qn} = Imag(y_n)$, where $N/2 \le n < N$; and

g) returning to step (c) for the next block of $N/2$ data values.